

خير الناس أنفعهم للناس

تجميعات

ALKALOIDS

BY/A.H.A

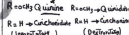
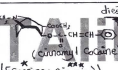
لا تنسونا من صالح دعائكم  
يظهر الغيب

Tyrosine derived From I phenylalkylamine alkaloids			II Pyridine alkaloids			
<b>① Ephedra alkaloids</b>  <b>(L-Ephedrine)</b> ↳ ephedra herb ↳ volatile sol. in H <sub>2</sub> O ↳ so ppt & mayer's (w/2% sol) NB: ethyl not used in extract? as ephedrine in aged alkaloids sol. by hydrolysis → 2-phenyl-2-propanolamine forming phosgene toxic gas.	<b>② KhaT alkaloids</b>  <b>(Cathinone) (Cathine)</b> ↳ KhaT leaves	<b>③ Peyote alkaloids</b>  <b>(mescaline)</b> ↳ Peyote ↳ sol. in H <sub>2</sub> O organic solvent	<b>i) only</b> <b>Trigonelline</b>  <b>(Trigonelline)</b> ↳ Foenugreek seed	<b>ii) Tetrahydro pyridine alk.</b> <b>Atropa alkaloids</b>  <b>(Atropine) (Scopolamine)</b>  <b>(Alkaloids) (Alkaloids)</b> ↳ Atropa nut	<b>iii) + other N base</b> <b>Tobacco alkaloids</b>  <b>(Nicotine) (Nicotinic acid)</b> ↳ volatile liquid ↳ Tobacco leaves	<b>iv) Pyridone alkaloids</b> <b>Ricinine</b>  <b>(Ricinine)</b> ↳ Castor seed
<b>① anti asthmatic</b> <b>② Nasal decongestant</b> <b>③ Sympathomimetic</b> <b>④ Chen's Test</b> + CaSO <sub>4</sub> + NaOH → Violet color ether → Purple color in ether layer Synthesis of ephedrine 	<b>① CNS stimulant</b> (Hallucinogenic) ↳ Cause Habitual and addict	<b>① Hallucinogenic &amp; psychomimetics</b> ↳ not cause Habitual and addict	<b>① Hypoglycemic</b>  <b>② Seeds defatting Mark</b> Free base & H <sub>2</sub> O Total alk.	<b>① Anthelmintic</b> <b>② CNS stimulant (to dose)</b> <b>③ + K Ferruginous → Blue</b> <b>④ + K Ferro cyanide → green</b> <b>⑤ Seeds defatting Mark</b> Free base & H <sub>2</sub> O Total alk.	<b>① Insecticide</b> Toxin in P dose (Pesticide) <b>② + PDMAH → Rose red color</b> lec. 2 → Page 5	<b>① poisonous (CN)</b> (Toxic alkaloid) <b>② + KMnO<sub>4</sub> → decoloring</b>
<b>④ Colchicum alkaloids</b>  <b>(Colchicine)</b> ↳ w/ base ↳ Colored alkaloids (yellow) ↳ Sol. in H <sub>2</sub> O ↳ Calchicine + CH <sub>3</sub>	<b>⑤ Capsicum alkaloids</b>  <b>(Capsaicin)</b> ↳ phenolic amide alkaloids ↳ pungent alkaloids (Pungency destroyed by KMnO <sub>4</sub> ) ↳ insol. in H <sub>2</sub> O	<b>⑥ Pilocarpine</b>  <b>(Pilocarpine)</b> ↳ non volatile liquid ↳ sol. in H <sub>2</sub> O, CH <sub>3</sub> ↳ insol. in ether ↳ lactone alkaloids	<b>a) pepper alkaloids</b>  <b>(Piperine)</b> ↳ Hemlock Fruit (Ginger) ↳ volatile, liquid <b>① Condiment</b> <b>② Rubefacient</b> ↳ + H <sub>2</sub> O → Red color	<b>b) Conium alkaloids</b>  <b>(Coniine)</b> ↳ Hemlock Fruit (Ginger) ↳ volatile, liquid <b>① local analgesic</b> ↳ + Na nitroprusside → Red color ↳ volatile color (nitroprusside)	<b>c) lobelia alkaloids</b>  <b>(Lobeline) (Lobeline hydrochloride)</b> ↳ Lobelia herb <b>① Expectorant</b> <b>② Bronchodilator</b> ↳ + Marquis → Red color ↳ Isolation of lobeline ↳ lobeline + CH <sub>3</sub> → lobeline HCl	<b>d) Pomegranate alkaloids</b>  <b>(Peltanine) (Isopeltanine)</b> ↳ Pomegranate
<b>① Treatment of Gout</b> <b>② plant hormone</b> Colchicine + Fecl <sub>3</sub> → Red color Colchicine + Fecl <sub>3</sub> → olive green color	<b>① Rubefacient (counter irritant)</b> <b>② anti rheumatic</b> ↳ + Fecl <sub>3</sub> → green color	<b>① Miotic &amp; choleragic</b> <b>② w/ of glaucoma</b> Helch's Test + H <sub>2</sub> O <sub>2</sub> + K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> → Violet color yellowish brown (in aqueous layer)	<b>Synthesis of lobeline</b> 	<b>Synthesis of lobeline</b> 	<b>Isolation of lobeline</b> ↳ lobeline + CH <sub>3</sub> → lobeline HCl	<b>Isolation of pomegranate alk.</b> lec. 3 → Page 10

### Quinoline alkaloids

[A] *Girchona alkaloid*

**[ii] Cinnamyl-CoGina**



← Cinchona bark →

- ① Antimalarial  $\rightarrow$  Quinine  
 ② Anticholinergic  $\rightarrow$  Guinidine  
 (cardiac depressant)

① +  $\text{KMnO}_4 \rightarrow$  decolorization



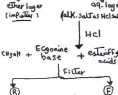
## odor



لست الذفضل ولكن لي أسلوبى -- ساطل دائما أتقبل رأى  
لناقد والحاسد فالذول يصح معارى والثانى يزيد

### Semisynthesis of Cocaine

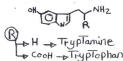
- Cocaine extract
- Hei  
ether





derived from Tryptophan

① Serotonin alkaloids

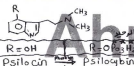


↑ Mammalian brain

Propriety

- ① Skin irritant  $\xrightarrow{\text{due to}}$  Histamine release
- ②  $\uparrow$  conc of 5-OH indole acetic acid  
intestinal Tumor  $\rightarrow$  indole (serotonin metabolite)

② Psilocin & Psilocybin alkaloids



51 → Psilocybe Fungus

① Insol. in $H_2O$	③ Sol. in $H_2O$
② Sol. in alcohol	④ Insol. in ether

③ Calabar bean alkaloids



51 Calabar bean

① Insol. in  $H_2O$  (3<sup>rd</sup>)  
② Sol. in  $CHCl_3$ , alcohol, Benzene

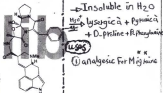
④ Ergot alkaloids

## ① Ergometrine



→ It has certain advantages over the water insoluble ergot alkaloids:  
as it does not produce nausea & vomiting  
It has oxytocic effect

② Ergotamine



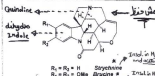
Source → Ergot Fungus

Tests

① + Marquis's reagent	→ <u>Brown color</u>
② + Vitalis reagent	→ <u>grayish green color</u>

① Psilocin + Marquis reagent → greenish  
psilocybin + Marquis reagent → orange color

⑤ *Nux Vomica* alkaloids  
(*Strychnos* alkaloids)



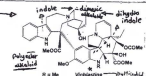
  $\xrightarrow{\text{in}}$  Nux vomica seed

- ① CNS Stimulant and Tonic. } Stimulant  
② Antidote for Barbiturate poisoning }  
③ Rodenticide }  
④ Toxic }  
① alcohol and oil deodorant }  
② additive agent to lubricants }  
③ less Toxic } Blurring

③ میں اتفالواضی الحماضرة میں ممکن Tests

- ① Strychnine + Mandelin's  $\rightarrow$  Violet  
② Brucine +  $\text{SnCl}_2 \rightarrow$  Violet

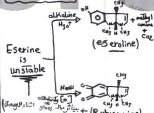
⑥ Vinca alkaloids  
(Catharanthus alkaloids)



in MnO<sub>2</sub> back

- ① Tt of Hodgkin's disease and Carcinoma } vincristine  
② anti cancer (cytotoxic effect) }  
① Tt of childhood leukemia } vincristine  
② anti cancer (cytotoxic effect) }

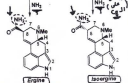
NB on eserine



## Lysergic acid derivatives

- (eg) ergotamine and ergometrine  
 ↓  
 ↑ Active / vasoconstrictor  
 ↓  
-ine

(-)-Lysergic acid      (+)-Isolysergic acid



### Isolysergic à discussion

- eg) ergotamine and  
ergometrine  
↓  
active is Dextrorotatory  
↓  
inine




① A clivine ergot alkaloids  $\xrightarrow{\text{light/UV light}}$  Inactive lumi derivatives  
(Fluorescent cpds) (non fluorescent cpds)

- عقار العلوم الطويل
- ② LSD (lysergic acid diethylamide)  $\rightarrow$  synthetic cpd (↑ Hallucinogenic effect)


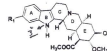
Test

- ① Van-Water's test:-  
alk. Soln + Van-Water's reagent  $\rightarrow$  deep Blue Color  
(PDAB + 15%  $H_2SO_4$  + FeCl<sub>3</sub>)
- 
- Estimation of ergot alkaloids
- by
- ① Colorimetrically
  - ② Fluorimetrically

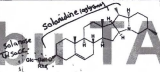
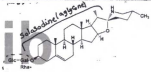
## VIII Purine alkaloids.

① Caffeine	② Theobromine	③ Theophylline
		
<p>Tea leaves → Caffeine seeds → Cocoa seeds</p>		
<p>① weak base → Form salt only w/ strong acids</p> <p>② give no ppt in Mayer's Test</p> <p>③ Sol. in H<sub>2</sub>O and Benzene</p> <p>④ CNS Stimulant</p> <p>⑤ relief Headache</p>	<p>③ give ppt in Wagner's Test</p> <p>④ slightly sol. in H<sub>2</sub>O</p> <p>⑤ Insol. in Benzene and NH<sub>4</sub>OH</p> <p>① Diuretic</p>	<p>④ give +ve in Murexide Test</p> <p>⑤ Sublimates without decomposition</p> <p>① Sol. in H<sub>2</sub>O and NH<sub>4</sub>OH</p> <p>② Insol. in Benzene</p> <p>③ smooth muscle relaxant → Bronchodilator</p>
<p><b>Tests:</b></p> <p>① Murexide Test → alk. + C.HCl + KClO<sub>4</sub> → Red color (w/ +ve for all)</p> <p>② Tannic acid Test → alk. soln + Tannic acid → white ppt (soluble in H<sub>2</sub>O)</p> <p>③ FeSO<sub>4</sub> Test → alk. soln + C.HCl + Br<sub>2</sub>/H<sub>2</sub>O + FeSO<sub>4</sub> + NH<sub>3</sub> → Blue color (w/ +ve for ②)</p>		

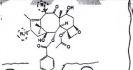
## XI Carboline alkaloids

① Yohimbin alkaloids	② Rauwolfia alkaloids
	
<p>(Yohimbine)</p> <p>in Yohimbin bark</p> <p>Uses → Aphrodisiac</p> <p>Test → + C.HCl + KClO<sub>4</sub> → Blue color</p>	<p>in Rauwolfia Root</p> <p>Reserpine, Reserpinamine, Deserpine</p> <p>Uses → antihypertensive (H<sub>2</sub> antagonist)</p> <p>Properties of Reserpine:</p> <p>① Reversible</p> <p>② weak base diester</p> <p>③ Insol. in H<sub>2</sub>O but sol. in CHCl<sub>3</sub></p> <p>④ Sol. in H<sub>2</sub>O → yellow solution Fluorescence</p>

## IX Steroidal alkaloids

① Solanine	② Solasorine (Solasodine)
	
<p>(Solanine)</p> <p>Solanum species</p> <p>→ insol. in H<sub>2</sub>O</p> <p>→ Sol. in aq. sol. ethyl alcohol</p> <p>① Solanidine + D-glucose + D-galactose → Solanum L. Rhamnos</p>	<p>(Solasorine)</p> <p>Solanum species</p> <p>→ sol. in H<sub>2</sub>O</p> <p>→ Jelly on cooling</p> <p>① Solasodine + D-glucose + D-galactose → Solanum L. Rhamnos</p>
<p>Uses → Strong material for synthesis of Steroidal drugs (aglycone part is used)</p>	

## ② Terpene alkaloids

Taxol	
	
<p>① + Marquis reagent → yellow color</p> <p>② + Mandelin's reagent → orange color</p>	<p>① + Marquis reagent → Red color</p> <p>② + SbCl<sub>3</sub> → Red color</p>
<p>Uses → anticancer (treats ovarian cancer, breast cancer, neck lymphoma)</p> <p>Induces polymerization of protein tubulin to form stable non-fun microtubules → stop cell division (mitosis) in cancer cell</p>	

### Related cpd of pharmaceutical importance

① Taxotene	② Docetaxel
<p>→ H<sub>2</sub>O-soluble</p> <p>→ Semi-synthetic drug</p> <p>→ used for ovarian and breast cancer</p>	<p>→ used as starting material for synthesis of Taxol</p>

ألقى من العواشي أنكره قساسة  
ولو يشع يسير من تسهيل المذاكره  
عليه لذلك لكتبتوني يدعوه  
صالحه يظهر الغيب. ولو أجد منكم  
أحتاج أي شيء فأتاقت امره

Dr. Ahmed Fopcu@yahoo.com  
Dr. aha2013@yahoo.com  
00904668687

H <sub>2</sub> O of Rauwolfia alkaloids
<p>① Reserpine → Reserpinic acid + Methanol + Trimethoxybenzoic acid</p> <p>② Reserpinamine → Reserpinic acid + Methanol + Trimethoxybenzoic acid</p> <p>③ Deserpine → Reserpinic acid + Methanol + Trimethoxybenzoic acid</p>